1: *Arch Toxicol* 1992;66(8):598-601

Increased urinary cadmium excretion and its relationship to urinary N-acetyl-beta-D-glucosaminidase activity in smokers.

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To assess the renal effects of low-level exposure to cadmium due to smoking we examined blood and urinary levels of cadmium and urinary excretions of N-acetyl-beta-D-glucosaminidase (NAG), beta 2-microglobulin (BMG) and metallothionein in 94 male workers aged 18-55 years. Both blood and urinary cadmium levels indicated excess exposure to cadmium caused by smoking. The urinary cadmium concentration ranged between 0.1 and 5.0 micrograms/g creatinine and increased significantly with age in the smokers. Neither urinary NAG nor BMG was increasec in the smokers compared from non-smokers. A positive relationship between urinary cadmium and metallothionein was obtained not only in the smokers but also in the non-smokers. Furthermore, in the smokers urinary cadmium and metallothionein was positively related with urinary NAG. Since NAG in urine mostly originates from tubular cells by lysosomal exocytosis, the results may reflect an early cadmium effect on the lysosomal functions. Inhibitory effect of cadmium o the lysosomal degradation activities was discussed as a possible explanation of the positive relationship of urinary cadmium and metallothionein to urinary NAG.

PMID: 1463395, UI: 93098727

PM3001192690